Security Analysis and Portfolio Management
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Lecture 29
Equity Valuation - VI

Welcome back. So, let us continue from where we left off, but before that as usual a quick recap. Now, we are talking about the discounted cash flow methods of valuation of equity to arrive at the intrinsic value of equity and I introduced several methods. In the enterprise DCF method, what we do is we work out the free cash flows to the firm and we discount them at the weighted average cost of capital, we use the post-tax weighted average cost of capital that is important.

I will reiterate that we use the post-tax weighted average cost of capital and in the numerator, when we work out the free cash flow to the firm, we do not add back the interest tax shield. So, the interest tax shield or the benefit of interest is accounted for by using the post-tax cost of capital, this reduces the cost of capital and as a result of which it enhances the value of the firm accounting for or due to the interest tax shields.

So, that is the enterprise DCF model. Then, I talked about the free cash flow to equity model or equity cash flow model in which we discount the equity cash flows or cash flows which are relevant or which are residual cash flows available for distribution to the equity shareholders. And we discount these cash flows at the levered cost of equity that is the cost of equity while keeping the debt, keeping the debt of the firm intact.

We will come back to it in more detail during the course of today's presentation, today's lecture, then we have the adjusted present value method, which I will introduce or recapitulate in a little bit of detail. So, let us get back to it. So, the adjusted present value now.

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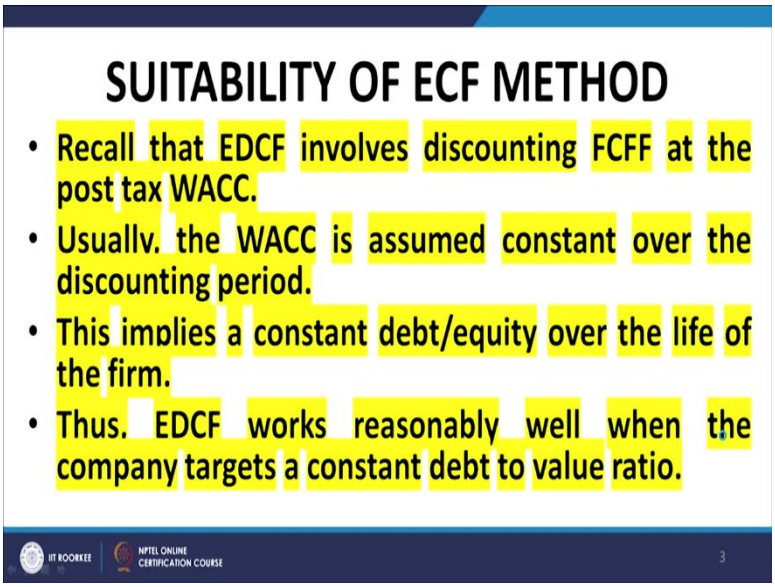

As I mentioned just know, the enterprise DCF model involves discounting free cash flows to the firm at the post-tax WACC. Now, there are two implications; 1, is that the interest tax shields are not added back when we work out the free cash flow to the firm, number 2, by using the post-tax WACC we are reducing the cost of capital by the influence or the impact of tax and as a result of it, the value of the tax shields is automatically incorporated in the value of the firm.

The value of the firm increases because the discount rate has decreased because why is the discount rate decreased? Because of the impact of interest tax shield and therefore, the increase in value due to the use of the post-tax cost of capital may be attributed to the effect of taxation on the indebt interest. The second important thing is that usually the WACC is assumed constant over the discounting period.

Whatever is the discounting period, it may be definite or indefinite as the case may be depending on the projected life of the firm, whether we follow the going concern concept or otherwise. And in any case, the practices, the practices is not mandatory, but it is a practice the practices that we use the constant work, WACC, when we discount the free cash flows to the firm.

The implication of this is that because we are using a constant WACC for discounting the cash flows of the firm, it implies that the debt equity ratio of the firm over the discounting period whatever it is, is constant. In other words, we are automatically making an assumption that the debt to equity ratio over the life of the firm or over the discounting period is constant, because we are assuming the WACC to be constant. Therefore, the enterprise DCF works

reasonably well when the company targets that constant debt to value ratio debt to equity ratio.

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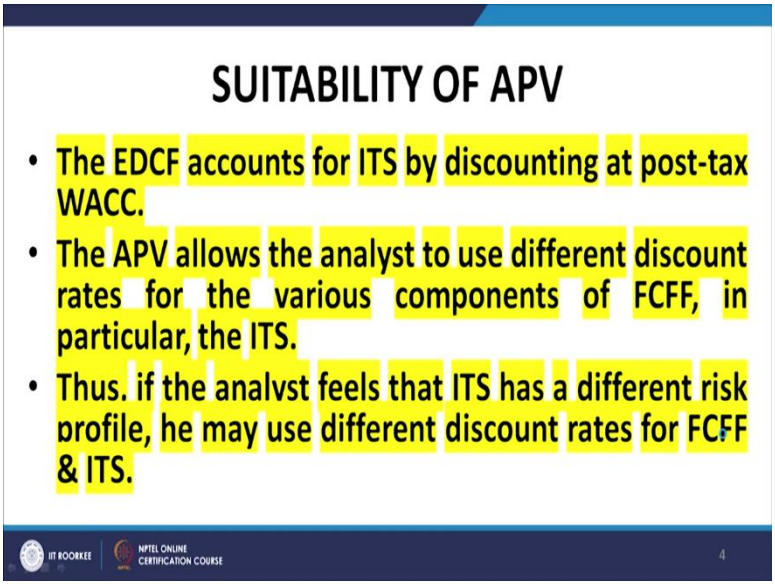

Now, the APV is a modification of the of the enterprise DCF. The Enterprise DCF as I reiterate again, and again, accounts for the interest tax shields by using a post-tax WACC. The APV allows the analyst to use different discount rates for the various components of free cash flow, in particular the interest tax shields.

In other words, what I am trying to say is that if the in the perception of the analyst the interest tax shields, the realizability of the interest tax shields is lesser or more risky compared to the other components of the free cash flow that is operating cash flows, then he can segregate the two cash flows, he can segregate the free cash flows without the impact of a taxation discount them at a particular rate and he can discount the interest tax shields separately.

Work out the interest deduction shield separately based on the explicit provisions of the taxation legislations and discount that it is as interest tax shields stream that he works out that he estimates at the discretionary or the chosen discount rate which he perceives to be a capturing the riskiness in the realizability of the interest tax shields.

So, what is NPV? What is the APV I am sorry, Adjusted Present Value unbundles, all the components of net present value, and analyses each one separately, whereas the enterprise DCF and WACC model that composite model bundles all the financing side effects into the discount rate. There is only one input which account for the riskiness of the overall riskiness

of the firm, which includes the riskiness of the ITS in the case of enterprise DCF, and the entire stream of cash flows is discounted at the WACC.

However, in the adjusted present value, you may use different rates for the different components of the free cash flow. You may discount the as is usually the practice, you may discount the free cash flows before ITS at the unlevered cost of capital and you may discount the DC the interest tax shield at an appropriately chosen discount rate which is representative of the risk profile of the realizability of those interest tax shields.

So, in the case of APV, the methodology or the approaches that we do the valuation first of the entity on the premise that it is entirely equity financed, in other words, we completely eliminate the impact of all debt financing from the analysis and presume and make the hypothetical assumption that the company is totally equity financed. And on the basis of that, we work out the what is called the base case value.

We work out all free cash flows to the firm on the premise that the business or the firm is totally equity finance. So, there is no impact of taxation, I am sorry, there is no impact of interest, there is no impact of interest. Number 2, having worked that out, the worked out the stream of free cash flows to the firm on the premise that it is debt free, we discount the stream of free cash flows to the firm at the unlevered cost of equity, I repeat, unlevered cost of equity.

So, in this case, we are presuming that the firm is totally equity financed. This is called the base case NPV. To reiterate to repeat, the base case NPV is the or the base case value, you may say, the base case value of the firm is the value of the firm on the premise that it is totally equity financed. And the discount rate that is used for working out the base case, NPV is the unlevered cost of equity, unlevered cost of equity.

The financing effects are not taken into account in working out the base case value, and then we adjust this base case value for the impact of the financing pattern. The financing, the impact of the financing pattern may manifest itself in terms of the interest tax shields, if you are introducing debt into the financing pattern or preference dividend for that matter. It may involve flotation costs, it may involve bankruptcy costs, all these things are taken care of separately.

The present values of each of these components, whether it is positive or negative, is worked out and it is algebraically added to the base case NPV, or the base case per value of the firm

to arrive at the composite value of the firm with the financing structure being what it is perceived.

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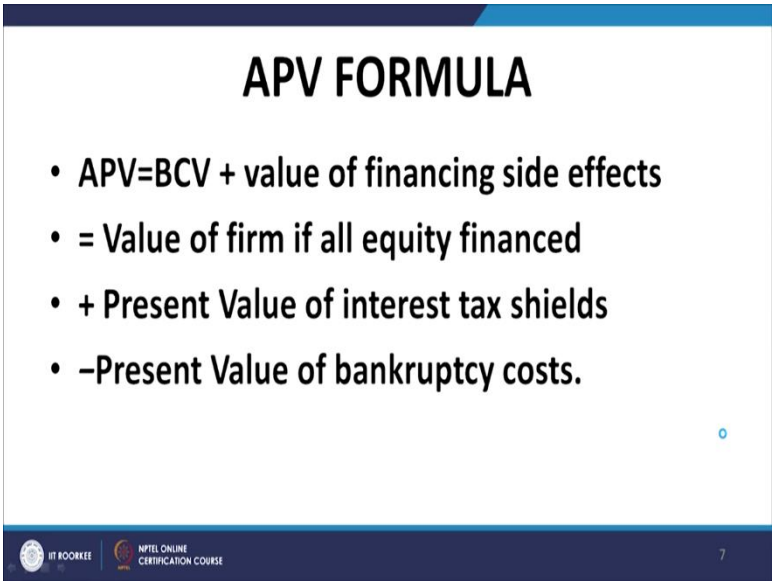

So, the adjusted present value formula, adjusted present value is equal to base case NPV plus value of financing side effects, that is equal to value of the firm if it is all equity finance, that is the unlevered firm you may say plus the present value of interest tax shields due to the introduction of debt, minus present value of bankruptcy costs and minus flotation costs if there are any flotation costs associated with the getting of debt for the company.

It involves a certain expenditures and that is also accounted for in working out the adjusted present value as a separate item. Now, the tax shields for any year are worked out from the product of the amount of interest into the tax rate, the amount of interest is nothing but the debt multiplied by the interest rate.

So, the tax shield for any year is equal to the interest rate into the amount of debt into tax rate, and we work out the ITS on this basis when we work out the value of the ITS, we may assume, if appropriate, we may assume this ITS as a perpetual cash flow and valuate at the chosen or the discretionary discount rate. Now, what about this chosen discount rate? What is the discretionary discount rate?

Well, the two extremes of the spectrum which are commonly used are the cost of debt or the cost of capital or to the firm. We use the cost of debt when we believe that the discount rate should be based on the assumption that the tax shields are about as uncertain as the debt payments generating them. I repeat the cost of debt may be used as discount rate on the

assumption that the tax shields are about as uncertain as the debt payments have generated them.

If the tax shields are considered riskier, you may use a higher discount rate and to the extent of course, you may if you feel that the realizability of these tax shields is related more to the business risk, then to the risk of default on the debt, then you may as well use the cost of capital or the unlevered cost of equity as the case may be. So, that is as far as your choice of the interest of the discount rate is concerned when you discount the interest tax shields is this is discretionary.

It could be the cost of debt. If you feel that the riskiness of realizability of the interest tax shields is related to the riskiness of default or riskiness of repayment and interest payments on the debt, they are meant, they mirror each other. Or if you feel that they are realizability of the tax shields is related to the overall riskiness of the firm, you could as well use the unlevered cost of equity as well.

Anything in between the two is more or less appropriate, depending on the analyst perception of the realizability of the tax shields. Bankruptcy costs may be introduced if the amount of debt is significant and if there is any possibility of the company and going on bad days and thereby unable to meet its debt obligations, we can make a subjective estimate of this bankruptcy costs and add them or deduct them while calculating the adjusted present value.

Now we come to the capital cash flows model. Now, this is again another variant of the free cash flow to the firm model. We will take it up now. In free cash flow valuation as I mentioned just now, the post-tax WACC is used to discount the free cash flows to the firm. And as I mentioned, just now I reiterate, the free cash flows to the firm do not account for the interest tax shields.

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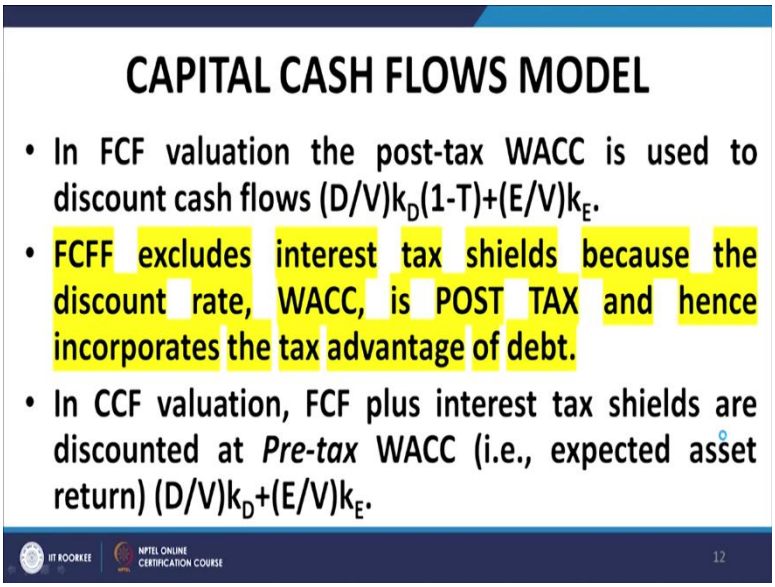

The tax effect or the tax impact is captured by using the WACC, the post-tax WACC and therefore incorporating the advantage of the tax shields into the valuation by reducing the cost of effective cost of debt by the amount of the tax protection or the tax saving. In the capital cash flows valuation what we do is we again we work out explicitly the interest tax shields, we work out the interest payments explicitly and then based on the premise or the provisions of the tax legislations we work out the interest tax shields.

And then we add this tax shields explicitly to the free cash flows which we work out without the impact of the interest tax shields as in the case of the enterprise DCF and then we discount this at the pre-tax WACC or pre-tax weighted average cost of capital. Now, please note the difference, so here is the difference in the enterprise DCF what we are doing is the impact of taxation is captured in the denominator in the discount rate by using the post-tax WACC.

In the capital cost model what we are doing is we are explicitly incorporating the ITS in the numerator. So, the impact of taxation is captured in the numerator while in the denominator, we are not capturing the impact of taxation, we are using the pre-tax WACC. So, here is the difference I repeat in the enterprise DCF model the tax impact is captured in the discount rate in the capital cash flow model the tax impact is captured in the cash flows and not in the discount rate.

So, how do we work out the capital cash flows, we simply add the interest tax shields on the basis of explicit working and we add this ITS, the interest tax shields to the free cash flow to

the firm. The rest of it is absolutely as per the earlier version of enterprise DCF. However, how we calculate the free cash flows to the firm the same process is repeated.

But now there is an additional term, one additional term that represents the impact of taxation that is the interest tax shield on debt or any other further matter any other impact of taxation that may arise out of the salient or the singular features of the enterprise and the provisions, relevant provisions of the taxation legislation.

So, the appropriate discount rate in the DCF valuation is a before tax rate it is a pre-tax WACC because the tax benefits of debt are included in this CCF as an explicit term. Pre-tax WACC is given by the formula that is right at the bottom of this slide D upon V into KD.

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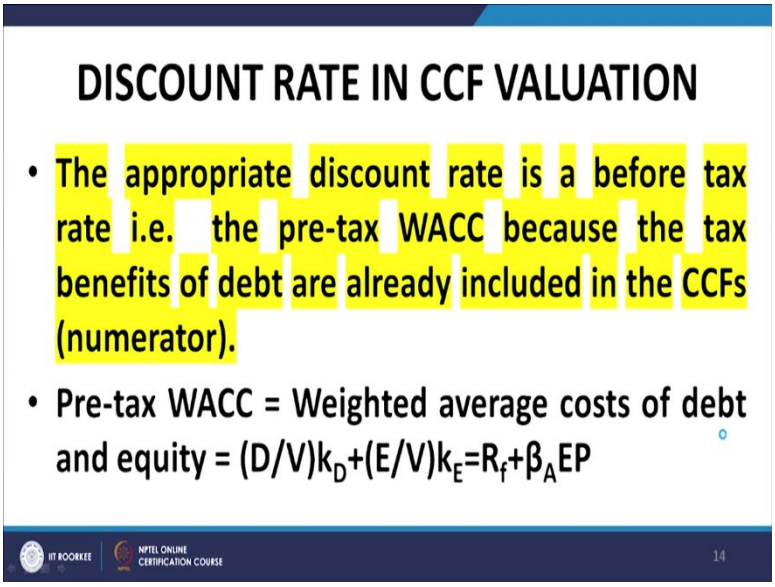

Please note in this case, there is no correction of 1 minus T and the cost of debt, that tax effect is not incorporated in the WACC plus E upon V into KE. KE is the levered cost of equity. Please note there is another point that KE is the levered cost of equity. That discount rate depends now, if we use the capital asset pricing model the see kappa model, then we can write the weighted average cost of capital or the pre-tax weighted average cost of capital in terms of the asset beta.

Please note the I am not using the equity beta I am using the asset beta or the unlevered equity beta, asset beta, it is synonymous with unlevered equity beta that is on the premise that there is no debt in the firm whatever is the working of the beta on the basis of the assets of the firm assuming that there is totally equity finance that is called asset beta on the hypothetical assumption that the firm is totally equity finance that is asset beta.

So, if we use the kappa model, and we use the asset beta we arrive at what is the pre-tax WACC and given by this standard, it is the cap m equation as RA plus beta A into the equity premium. So, now, if you look at this formula, this cap m formula, you find that it is independent of the debt equity ratio of the firm it depends purely on the risk-free rate the asset beta of the firm and the equity premium, it does not depend on the debt equity ratio of the firm.

And therefore, the pre-tax WACC is independent of the capital structure of the firm and hence can be applied to all cash flows regardless of the capital structure of the firm. This is important. The asset beta being independent of the debt equity ratio, it is constant it is independent of the capital structure of the firm and can be, hence you can apply it to all cash flows regardless of the capital structure of the firm.

In other words, if a firm has a dynamic capital structure, capital structure in which the asset and the debt equity ratio I am sorry is changing, then it becomes difficult in that case, to use the enterprise DCF model. The CCF model then comes to our rescue, then we can use that model with a single discount rate which is equal to the pre-tax WACC. And because this pre-tax WACC on the assumptions of the cap m happens to be independent of the debt-to-equity ratio of the firm. In other words, pre-tax WACC which is a function of asset beta is constant.

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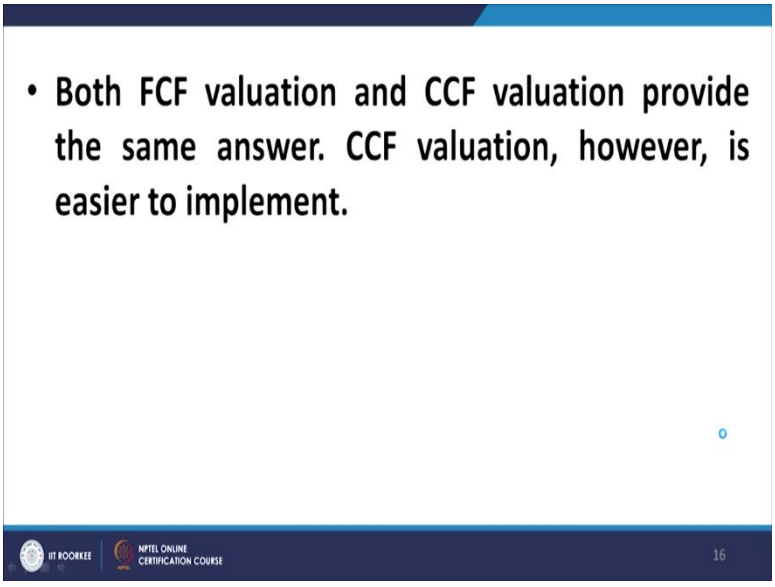

So, both FCF valuations and capital cash flow valuations provide the same answer. Algebraically they may be, they may be shown to be equivalent on certain assumptions, if you make certain assumptions, we can algebraically explicitly show that the results that we obtained by the by the enterprise DCF model and the capital cash flow model converge. The

advantage of the capital cash flow model, we can explicitly estimate the ITS. Now, this is important this is what I was mentioning a few minutes back.

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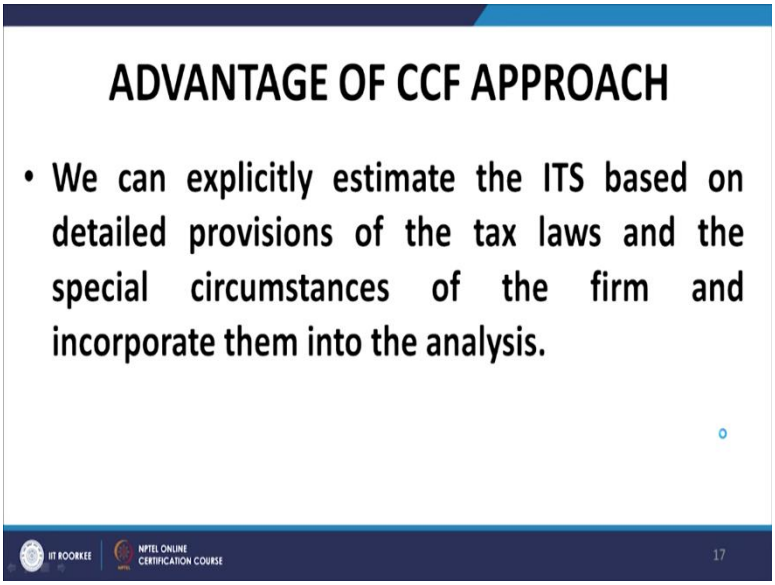

We can explicitly estimate the interest tax shields based on the detailed provisions of the taxation laws and the singular characteristics of the firm and incorporate them into the analysis. So, it is you see what happens is when we use the enterprise DCF model, we are simply multiplying KD by 1 minus T, 1 minus the tax rate, it is a mechanical process, it does not really take care of certain allowances, deductions and so, many other incentives or otherwise that are given in the taxation legislation, which may hold for a particular firm in relation to the net amount of tax that it has to pay.

So, however, in the case of CCF, because we are explicitly putting in the value of the interest tax shield or the tax saving in the numerator, we can explicitly work out the tax revenue saving, taking into account the detailed provisions, provision by provision of the taxation legislation as they apply to the target company that we are valuing.

So, we can arrive at a explicit figure of the interest tax shield or the tax saving as the case may be and incorporate that into the analysis. Unlike the enterprise DCF is simply involves a mechanical making multiplication by the 1 minus T factor.

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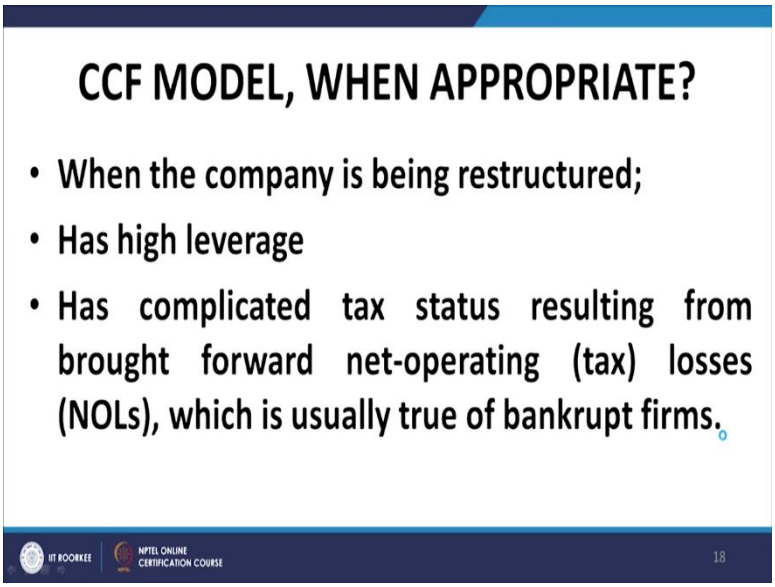

Now, this CCF model is appropriate, when the company is being restructured, when it is a debt reach company and the company is not doing well. And therefore, the company is being restructured or it has high leverage.

Now, as I mentioned, it is a debt reach company, substantial debt exists in the company or it has a complicated tax structure status as again I mentioned just know it there are certain provisions like for example, the carry forward losses are there and those losses could be set off against future profits under the provisions of the Income Tax Act, which cannot be accounted for in the EDCF model.

Because, as I mentioned, that involves simply a multiplication by the 1 minus T factor that account for the current taxation effects, not have brought forward taxation effects, brought forward losses brought forward depreciation and in such other items as the case may be, and incentives and rebates that may be available, which that EDCF model cannot model into its discount rate.

So, it, if it has a complicated tax status resulting from brought forward net operating tax losses. It has tax losses which is carried forward, NOLs, which is usually true of bankrupt firms.

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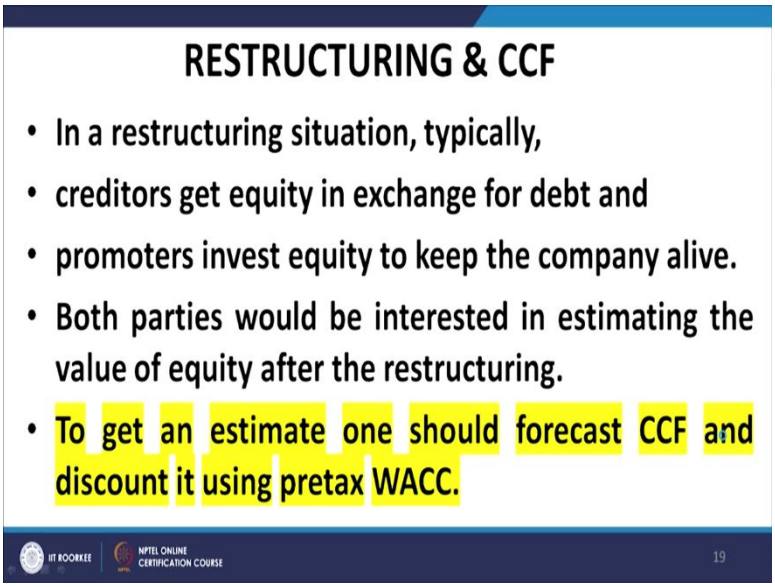

Now, restructuring and capital cash flow. Capital cash flows is relatively more appropriate more compatible model for firms that are undergoing restructuring. In a restructuring exercise, what normally happens is that the creditors get equity in exchange for debt and the promoters bring in more equity to keep the company alive, these are more or less standard in a rehabilitation package.

Whenever you look at a rehabilitation package that is sanctioned or endorsed by financial institutions or banks, you will find that the restructuring program will usually almost invariably involve the creditors getting equity in return for the claims and the promoters been asked to fund us a substantial portion of the cash losses in order that the firm may be kept alive or the maybe the product structure may be changed or new machinery, renovation or whatever the case may be, so that the company can be rejuvenated.

To continue with optimally or in such a way that it is able to survive or sustain itself. So, that bring the case, and the financial institutions usually either forego the interest on the loans, that they have sanctioned or they have reorganization or restructuring of the of the outstandings, which include the loans, as well as the principle in default, if any.

So, both the parties that is the creditors that will include the financial institutions, both the parties would be interested in estimating the value of equity after the restructuring, where the CCF model becomes quite useful. Now how to calculate the CCF terminal value. In a normal course, it is more or less similar to the enterprise DCF, DCF terminal model, we assume that the capital cash flows grow at a constant rate in perpetuity and we work out the model using

the pre-tax WACC we work out the terminal value based on the pre-tax WACC and an explicit perpetual growth rate.

That is if, when this situation will subsist or this model will be sufficient adequate if there are no net operating losses or not tax losses being brought forward. If there are tax losses being brought forward after the lapse of the after the end of the explicit forecasting period, then you have to be careful, then it would be necessary to split up the calculation of the terminal value into two phases.

One phase the first phase which would be finite would extend to the period up to which the tax losses are either absorbed by the profits or their income they expire of their own. There is usually a finite timespan up to which you can carry forward tax losses. In other words, up to which you can adjust those tax losses against profit for the current year.

For example, if you have a problem or tax losses for the year 0, you can set it off against profit for year 1 or year 2 or year 3 as the case may be used, but usually there is a finite period you cannot carry forward these losses indefinitely.

That is usually the case in India as per the Indian tax laws, you can carry forward losses for a maximum of 8 years, up to 8 years, if you are not able to absorb the losses in the profits, then those losses expire you cannot carry forward the losses any further. So, the first phase of the calculation of the terminal value is split up into 2 phases. The first phase is usually finite, and it extends to that point in time up to which all this case brought forward.

Tax losses are either absorbed in the profits of the company or they expire of their own because of non-absorption and the restrictions embodied are incorporated in the income tax law. Then we have a second phase, in the second period, phase we assume that there are no tax losses to be carried forward. And then we work out the terminal value in the manner that I have just alluded to by assuming a uniform growth rate and assuming the pre-tax WACC.

So, on that basis, we work out the second phase of the terminal value as a perpetuity using the perpetual growth rate using an estimate of the perpetual growth rate, there would be no carry forward losses, because the losses would either have been completely absorbed in the first phase or they would have been they would have expired under the provisions of the tax laws.

So, in the second phase, you only have to work out the terminal value as per the normal practice that is using a perpetual growth rate and using the pre-tax weighted average cost of capital.

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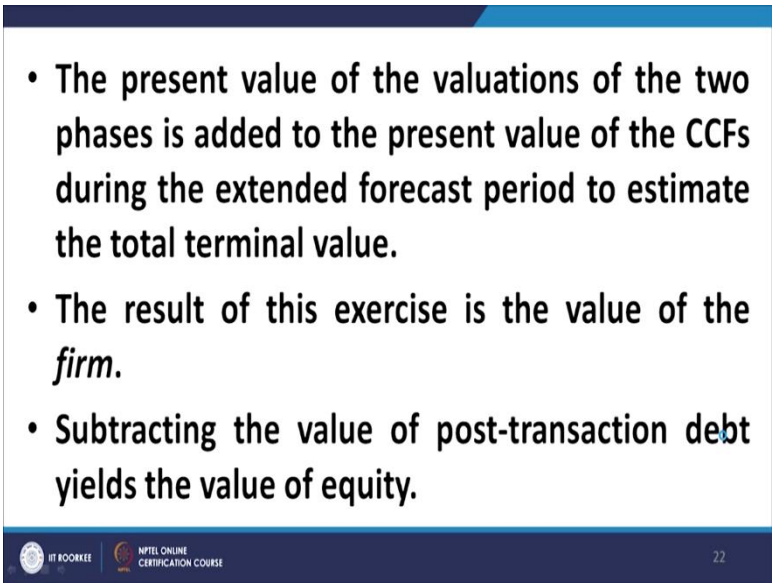

Then the present value of the valuations of the two phases is added to the present value of the CCF during the extended forecast period to estimate the total terminal value, the result of this exercise is the value of the firm if you subtract the value of post transaction debt, then you can the value frequently these are standard routine matters.

So, now we come to a very important point the issue of short-term debt in WACC, I have so far been emphasizing that when we work out the WACC or we work out the return-on-investment ROI or ROI return on capital employed also we focus on the long-term debt.

In other words, or even when we work out the free cash flows to the firm. The bucket of stakeholders that we consider it is that including the long-term lenders, the preferred shareholders and the equity shareholders, I have not included a short-term debt in this particular basket or in this particular bucket.

There is a reason for this in fact, there are conflicting views on this, some of the proponents advocate that short term debt being in the nature of debt should also be included in this basket that means the basket would include short term debt, long term debt, preferred shareholding and equity. But the general feeling or the general view amongst the academicians is that short term debt should not be considered when we calculate this bucket or when we calculate the free cash flows to the firm.

The reason is that short term debt is defined in their perspective, short term debt is defined as that debt which is taken by the company to manage short term liquidity crisis. In other words, to meet seasonal issues, seasonal requirements of working capital, you may resort to short

term debt and they are, they partake the nature of the sundry creditors or the trade creditors, and they are repaid in a similar manner.

The essences that do not they, these funds do not remain in the firm long enough to influence or to increase to contribute to the growth of the firm and that is why, when we talk about the valuation of the firm, we do not include short term debt as part of the basket, when we calculate basket of stakeholders, when we calculate the free cash flow to the firm, but I emphasize that there is a conflict of view among analysts, among academicians on this issue, the general perception I may say is that only long term debt is to be included.

But there is a catch here whatever may be the view, whatever may be your view, when you are doing the evaluation, it is very important, it is very fundamental that you must define the cash flows or the EBIT accordingly, the interest, for example, if you are considering the basket of stakeholders to comprise only of long term lenders and preferred shareholders and the equity shareholders.

Then EBIT that were working out must be after short term interest, short term interest must be treated as any other expense in the in the P and L account, it should not be part of EBIT, it should be removed from EBIT if you are not including short term debt in the basket. On the other end, if you are including short term debt in the basket, then you must include the interest on the short-term debt as part of EBIT, EBIT would be inflated by the amount of interest that is there in the, or that is there on the short-term debt.

So, whatever view you take the important thing is consistency, compatibility that is fundamental. You must work out the EBIT as well as the interest tax shields. If you are including short term debt in the basket of stakeholders, then the interest tax shield must also include interest in short term debt. However, if you are deducting interest or on short term debt before calculating EBIT, then obviously, the ITS will not include interest on short term debt it will include interest on your long-term debt, so, that this is the important thing.

We need to be consistent; we need to be compatible while doing any valuation exercise. Now, we come to the issue of levering and unlevering the cost of equity, which I shall take up immediately after the break. Thank you.